

CLAIMS

What is claimed is:

- 5 1. A sensor for sensing movement of a movable object, comprising:
- a) at least one magnet attachable to the movable object, the magnet generating
 either a variable magnetic field or a variable polarity field, the magnet having
 a first end, a second end and a central portion;
- 10 b) a first magnetic flux sensor positioned near the central portion of the magnet,
 the first magnetic flux sensor generating an electrical signal that is indicative
 of a specific position of the movable object; and
- c) a second magnetic flux sensor positioned near the first end of the magnet,
 the second magnetic flux sensor generating an electrical signal that is
 indicative of when the movable object has reached a pre-determined location.
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2. The sensor of claim 1, wherein the first and second magnetic flux sensors are
 mounted to a printed circuit board.
- 20 3. The sensor of claim 1, wherein the first magnetic flux sensor is a linear hall effect
 device.

4. The sensor of claim 1, wherein the second magnetic flux sensor is a switch type hall effect device.
5. The sensor of claim 1, wherein the sensor is mounted in a housing.
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6. The sensor of claim 1, wherein the magnet is a tapered magnet.
7. The sensor of claim 1, wherein the moveable object is a clutch pedal.
- 10 8. The sensor of claim 1, wherein the magnet has a second magnet attachable to the first end and a third magnet attachable to the second end.
9. The sensor of claim 1, wherein the magnet has a first pole piece attachable to the first end and a second pole piece attachable to the second end.
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10. The sensor of claim 1, wherein the first magnetic flux sensor generates a linearly changing voltage as the magnet moves relative to the sensor.
11. The sensor of claim 1, wherein the second magnetic flux sensor generates a
- 20 step voltage as the magnet moves relative to the sensor.

12. A sensor for sensing position of a moveable object, comprising:

a magnet attachable to the object, the magnet having a pair of ends and a central portion;

5 a first magnetic flux sensor positioned about the central portion of the magnet, the first magnetic flux sensor generating an electrical signal indicative of a specific position of the movable object; and

a second magnetic flux sensor positioned about the first end of the magnet, the second magnetic flux sensor generating an electrical signal indicative of when the

10 movable object has reached a pre-determined location.

13. The sensor according to claim 12 wherein, the magnet generates a slowly changing flux field near the central portion and a rapidly changing flux field at the ends.

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14. The sensor according to claim 13 wherein, the first and second magnetic flux sensors are hall effect devices.

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15. A sensor for sensing movement of a movable object, comprising:
- a) at least one magnet attachable to the movable object, the magnet having a first end, a second end and a central portion;
 - b) the first and second ends of the magnet having a first flux density that
- 5 changes about the ends;
- c) the central portion of the magnet having a second flux density that changes more slowly about the central portion than about the ends of the magnet;
 - d) a first magnetic flux sensor positioned about the central portion of the magnet, the first magnetic flux sensor generating a first electrical signal indicative of a
- 10 specific position of the movable object; and
- e) a second magnetic flux sensor positioned about the first end of the magnet, the second magnetic flux sensor generating a second electrical signal indicative of the movable object reaching a pre-determined location.
- 15 16. The sensor according to claim 15 wherein, the second magnetic flux sensor functions as a first switch.
17. The sensor according to claim 15 wherein, a third magnetic flux sensor is positioned about the second end.
- 20 18. The sensor according to claim 17 wherein, the third magnetic flux sensor functions as a second switch.

19. The sensor according to claim 15 wherein, the first electrical signal is linear.

20. The sensor according to claim 15 wherein, the second electrical signal is step shaped.

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21. A sensor for sensing movement of an attached movable object, comprising:

- a) a first magnet connectable with the movable object, the magnet adapted to generate a magnetic field as the magnet is moved, the magnet having a first north pole, a first south pole and a central portion;
- 10 b) a second magnet attached to the first magnet, the second magnet having a second north pole and a second south pole, the second north pole located adjacent the first south pole and the second south pole located adjacent the first north pole;
- c) a first magnetic flux sensor positioned near the central portion of the magnet, the first magnetic flux sensor adapted to generate an electrical signal that is indicative of
15 a specific position of the movable object; and
- d) a second magnetic flux sensor positioned near the first north pole, the second magnetic flux sensor adapted to generate an electrical signal that is indicative of when the movable object has reached a pre-determined location.

22. The sensor according to claim 21 wherein, a third magnet is connected with the movable object, the third magnet having a third north pole, a third south pole and a central portion, a fourth magnet attached to the third magnet, the fourth magnet having a fourth north pole and a fourth south pole, the fourth north pole located adjacent the
5 third south pole and the fourth south pole located adjacent the third north pole.

23. The sensor according to claim 21 wherein, the second magnet creates a flux field with a larger gradient with a change in position.